

# PATENT ABSTRACTS OF JAPAN

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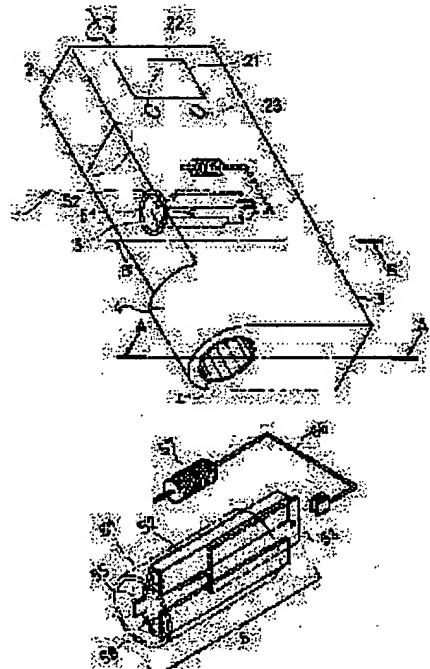
(72)Inventor : NAGATA RYOHEI  
TAKANO ATSUSHI  
NAKAGAWA YOSHIKAZU  
OKA MOTOHIRO

## (54) BLOOD-ANALYZING APPARATUS

### (57)Abstract:

PROBLEM TO BE SOLVED: To easily collect blood not by sucking thereby to analyze blood simply and quickly, by constituting a blood-analyzing device of a blood collection mechanism, a piercing member, an electrode and a display part, and congesting a finger with blood by the blood collection mechanism to collect blood.

SOLUTION: A main switch 22 is turned on and a finger is inserted in a tightening member 41 of a blood-collecting member 3. A display member 2 is rotatable to the member 3. Therefore, the display member 2 can be rotated into a state easy to see even when a right finger or a left finger is inserted in the member 41. When a piercing blade projection switch 23 is turned on, an electromagnet 57 is driven, and a piercing needle 53 is projected from a projecting part 55 of a base body 52 via an arm member 56 to cut the skin of the finger tip. Then, the piercing needle is returned to the original position by the action of a leaf spring 58. At the same time, the member 41 is driven, so that the finger is congested with blood which is squeezed out and brought in touch with an electrode of the projecting part 55. A substance to be detected in the blood is sent as an electric signal to a sensor, and a measured value is displayed at a display screen 21.



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**CLAIMS**

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**[Claim(s)]**

[Claim 1] Hemanalysis equipment with which a blood collecting device, a puncture member, an electrode, and a display are provided, and said blood collecting device is characterized by having the means made congested.

[Claim 2] Hemanalysis equipment according to claim 1 characterized by said puncture member and electrode being a cartridge-type.

[Claim 3] Hemanalysis equipment according to claim 1 or 2 characterized by installing said electrode in the location which contacts the blood which bled in the condition that the body was equipped with hemanalysis equipment.

[Claim 4] Hemanalysis equipment according to claim 2 or 3 which the base of a cartridge has tabular, and the puncture member is prepared in one side possible [ sliding ], and is characterized by arranging the electrode in an another side side.

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**TECHNICAL FIELD**

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[Field of the Invention] This invention relates to the hemanalysis equipment which possesses all of a blood collecting device, a puncture member, an electrode, and a display especially about the hemanalysis equipment which can analyze the detected matter contained in blood, such as the blood sugar level.

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**PRIOR ART**

[Description of the Prior Art] Conventionally, when the blood sugar level etc. was measured, it was carrying out by making the blood drop adhere to the electrode with which attached the blemish to the fingertip using the reusable puncture instrument (Lancet), pressed out the blood drop from there, picked out from the wrapping material, and the sensor was equipped. However, when the reusable puncture instrument and the sensor have dissociated in this way, there are many processes which are required in performing a series of actuation.

[0003] Then, the blood collecting machine (refer to JP,5-95937,A and JP,5-95938,A) with which the blood collecting machine (refer to JP,5-111476,A, JP,6-311980,A, JP,6-327655,A, and JP,7-51251,A) with which the medical-application system (refer to JP,61-286738,A) by which the reusable puncture needle, the capillary tube, and the sensor were united, a reusable puncture needle, a suction implement, and \*\*\*\*\* were united and a reusable puncture needle, a suction implement, \*\*\*\*\*, and a sensor were united was proposed.

[0004] However, the blood collecting approach in these instruments It is what is depended on the method with which all are decompressed by the syringe, a syringe, etc. and attract blood. unless it sticks the base of a cylinder on the skin, it cannot decompress, but when the cylinder below phi1.5 mm is used, blood plugs up a hole with the former, there is a fault of bleeding stopping, and the structure of a syringe is complicated in the latter -- etc. -- there was a fault.

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**EFFECT OF THE INVENTION**

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[Effect of the Invention] According to this invention, it can collect blood easily by the approach by suction, and blood can be analyzed that it is simple and quickly.

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**TECHNICAL PROBLEM**

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[Problem(s) to be Solved by the Invention] The technical problem of this invention is offering the convenient hemanalysis equipment which has the device it collecting blood by the approach by suction, and possesses a puncture member, an electrode, and a display.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

[Field of the Invention] This invention relates to the hemanalysis equipment which possesses all of a blood collecting device, a puncture member, an electrode, and a display especially about the hemanalysis equipment which can analyze the detected matter contained in blood, such as the blood sugar level.

**[0002]**

[Description of the Prior Art] Conventionally, when the blood sugar level etc. was measured, it was carrying out by making the blood drop adhere to the electrode with which attached the blemish to the fingertip using the reusable puncture instrument (Lancet), pressed out the blood drop from there, picked out from the wrapping material, and the sensor was equipped. However, when the reusable puncture instrument and the sensor have dissociated in this way, there are many processes which are required in performing a series of actuation.

[0003] Then, the blood collecting machine (refer to JP,5-95937,A and JP,5-95938,A) with which the blood collecting machine (refer to JP,5-111476,A, JP,6-311980,A, JP,6-327655,A, and JP,7-51251,A) with which the medical-application system (refer to JP,61-286738,A) by which the reusable puncture needle, the capillary tube, and the sensor were united, a reusable puncture needle, a suction implement, and \*\*\*\*\* were united and a reusable puncture needle, a suction implement, \*\*\*\*\*, and a sensor were united was proposed.

[0004] However, the blood collecting approach in these instruments It is what is depended on the method with which all are decompressed by the syringe, a syringe, etc. and attract blood. unless it sticks the base of a cylinder on the skin, it cannot decompress, but when the cylinder below phi1.5 mm is used, blood plugs up a hole with the former, there is a fault of bleeding stopping, and the structure of a syringe is complicated in the latter -- etc. -- there was a fault.

**[0005]**

[Problem(s) to be Solved by the Invention] The technical problem of this invention is offering the convenient hemanalysis equipment which has the device it collecting blood by the approach by suction, and possesses a puncture member, an electrode, and a display.

**[0006]**

[Means for Solving the Problem] By adopting the blood collecting device in which it has the means which this invention person etc. makes congested in view of the above-mentioned technical problem as a result of wholeheartedly research, even if not based on the suction approach, it could collect blood easily, and a header and this invention were completed for the ability of blood to be analyzed that it is simple and quickly.

[0007] That is, this invention possesses a blood collecting device, a puncture member, an electrode, and a display, and is hemanalysis equipment with which said blood collecting device is characterized by having the means made congested. Moreover, this invention is the above-mentioned hemanalysis

equipment characterized by the puncture member and the electrode being a cartridge-type. Furthermore, this invention is the above-mentioned hemanalysis equipment characterized by installing said electrode in the location in contact with the blood which bled in the condition that the body was equipped with hemanalysis equipment.

[0008] The base of a cartridge has tabular, the puncture member is prepared in one side possible [ sliding ], and this invention is the above-mentioned hemanalysis equipment characterized by arranging the electrode in an another side side further again.

[0009]

[Function] With the hemanalysis equipment of this invention which has the device in which it collects blood with the means made congested, and possesses a puncture member, an electrode, and a display The problem that it cannot decompress unless it sticks the base of the problem accompanying the approach of collecting blood by suction, i.e., a cylinder, on the skin, When the cylinder below phi1.5 mm is used, blood plugs up a hole. The problem that bleeding will stop, the problem that the structure of a syringe is complicated, etc. are solvable, and a general user cannot need skill, but can collect blood easily and quickly, and can analyze the detected matter.

[0010] Moreover, if the puncture member and electrode in hemanalysis equipment of this invention are made into a cartridge-type, since they can be made throwing away in one, bacterial infection etc. can be prevented. [ arrange / installing the electrode in the hemanalysis equipment of this invention in the location in contact with the blood pressed out by the congestion from the skin, and / furthermore, / in the background of a base prepared possible / sliding / a puncture member ] Since the blood which bled contacts an enzyme and an electrode immediately, it is not necessary to establish a means to contact especially blood to an electrode etc., a series of actuation processes which analysis takes can be reduced, and inspection can be substituted for one-touch.

[0011]

[Example] Hereafter, this invention is explained to a detail with reference to a drawing. The perspective view of hemanalysis equipment with an example of this invention is shown in drawing 1. Moreover, it is drawing 2 (a) about the A-A sectional view of the hemanalysis equipment 1 in drawing 1. It is drawing 2 (b) about a B-B sectional view. It is shown. This hemanalysis equipment 1 has the display material 2 and the blood collecting member 3. The display screen 21, the main switch 22, and the puncture cutting-edge discharge switch 23 are formed in the display material 2, and the display material 2 is pivotable to the blood collecting member 3 (refer to drawing 3 ).

[0012] On the other hand, the blood collecting member 3 has the binding section 4 and the puncture section 5. The binding section 4 has become cylinder-like and a finger is inserted into this cylinder. The binding member 41 which makes a finger congested is formed in the interior of the binding section 4. Although this binding member 41 may consist of what kind of thing as long as it can make a finger congested, the thing using impregnation of air, the thing using the draw-down of the belt by the drive of a motor etc., etc. can be used like the pressurization band used for measurement of blood pressure, for example.

[0013] As shown in drawing 4 , the puncture section 5 has the tabular base 52 held in the sleeve 51 and the sleeve 51. The puncture cutting edge 53 is formed in one base 52 side possible [ sliding ] (refer to drawing 5 (a) and (b)), and it is electrode 54a in an another side side. And electrode lead 54b It is arranged (refer to drawing 5 (c)). A base 52 has a height 55 and is electrode lead 54b. It extends to this height 55 and is electrode 54a. It forms. Electrode 54a in a height 55 Enzyme ink (not shown) is applied to one side. When various things can be chosen according to the detected matter in blood, for example, it measures the blood sugar level, the ink constituent containing glucose oxidase etc. can be used for enzyme ink. In addition, it is drawing 5 (d) about the perspective view which looked at the base 52 and the puncture cutting edge 53 from back. It is shown.

[0014] This puncture cutting edge 53, a base 52, and a sleeve 51 constitute the dismountable cartridge 6 from a blood collecting member 3. Therefore, it will become very advantageous for reasons of sanitation

by making this cartridge 6 throwing away. The puncture cutting edge 53 is driven with an electromagnet 57 through the arm member 56, and projects from the height 55 of a base 52. An electromagnet 57 is driven by the interaction with the magnet (not shown) installed into the blood collecting member by turning on and off of the puncture cutting-edge discharge switch 23. The flat spring 58 is installed in the base 52, and the puncture cutting edge 53 projected by the arm member 56 is retreated. For the amount of protrusions from the height 55 of the puncture cutting edge 53, the blood (blood drop) which is in the condition which equipped this hemanalysis equipment 1 with the finger, and bled is electrode 54a in a height 55. What is necessary is just to set up so that it can contact. In addition, although the approach of driving the puncture cutting edge 53 using an electromagnet 57 was applied in this example, this invention is not limited to this but can drive the puncture cutting edge 53 by various approaches.

[0015] How to measure the detected matter in blood is explained using the above-mentioned hemanalysis equipment. First, a main switch 22 is turned on and a finger is inserted in the binding member 41. a finger -- which finger -- you may be -- moreover, right and left -- you may be which digit manus. Since the display material 2 is pivotable, when a left finger is inserted with the hemanalysis equipment 1 of this invention, it is drawing 3 (a). Like, when a right finger is inserted, it is drawing 3 (b). It can be made easy to use it, rotating the display material 2 like.

[0016] In this condition, the puncture cutting-edge discharge switch 23 is turned on. If the reusable puncture needle discharge switch 23 is turned on, an electromagnet 57 drives and the puncture cutting edge 53 projects from the height 55 of a base 52 through the arm member 56. The projecting puncture cutting edge 53 returns to the original location according to an operation of a flat spring 58, after damaging the skin of a fingertip. The binding member 41 drives with it, a finger is made congested, and blood is pressed out from the skin which got damaged. The pressed-out blood drop is electrode 54a in a height 55. It contacts, and the detected matter in blood serves as an electrical signal, it is sent to a sensor, and measured value is shown in the display screen 21.

[0017] According to the hemanalysis equipment of such this invention, a series of actuation processes can be reduced and inspection can be substituted for one-touch. Moreover, since this equipment possesses all of a blood collecting device, a puncture member, an electrode, and a display, a general user does not need skill but can use it easily and quickly. Furthermore, with the hemanalysis equipment of this invention, not only the blood sugar level but the various matter in blood can be analyzed by changing the class of enzyme ink to be used.

[0018] As mentioned above, although this invention was explained to the detail using the drawing, this invention can perform various modification, unless it deviates from the thought of this invention, without being limited to this. For example, another example from which the drive of a blood collecting device, a puncture member, an electrode, and a puncture member differs is shown in drawing 6 - drawing 8 . As shown in drawing 6 , the cartridge 6 consists of a sleeve 51, a blood collecting member 71 of the shape of an rectangular pipe held into the sleeve 51, and a reusable puncture needle 72 that slides on the inside of the blood collecting member 71. In this example, a reusable puncture needle 72 is hammered out with the hammer 82 connected with the spring 81, and projects from the blood collecting member 71. What is necessary is just to establish a means which operates that what is necessary is just to perform actuation of a hammer 82 with a conventional method when the reusable puncture needle discharge switch 5 is pushed. In addition, as shown in drawing 7 , the spring 73 for returning root Motobe of a reusable puncture needle 72 the hammered-out reusable puncture needle 72 is installed.

[0019] Two electrodes 92 and 93 are formed in the wall 91 which constitutes the rectangular pipe of the blood collecting member 71, and enzyme ink 94 is applied to one electrode 93 (refer to drawing 8 ). These electrodes 92 and 93 are connected to a sensor (not shown) through a sleeve 51. The blood collecting member 71 is installed in the location where the blood drop pressed out from the skin contacts, and the centrum 95 of the blood collecting member 71 is set as size in which a blood drop is absorbed by capillarity. The blood collecting member 71 is produced with the ingredient which performs hydrophilic processing to the interior of the blood collecting member 71, or has a hydrophilic property

preferably.

[0020]

[Effect of the Invention] According to this invention, it can collect blood easily by the approach by suction, and blood can be analyzed that it is simple and quickly.

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**MEANS**

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[Means for Solving the Problem] By adopting the blood collecting device in which it has the means which this invention person etc. makes congested in view of the above-mentioned technical problem as a result of wholeheartedly research, even if not based on the suction approach, it could collect blood easily, and a header and this invention were completed for the ability of blood to be analyzed that it is simple and quickly.

[0007] That is, this invention possesses a blood collecting device, a puncture member, an electrode, and a display, and is hemanalysis equipment with which said blood collecting device is characterized by having the means made congested. Moreover, this invention is the above-mentioned hemanalysis equipment characterized by the puncture member and the electrode being a cartridge-type. Furthermore, this invention is the above-mentioned hemanalysis equipment characterized by installing said electrode in the location in contact with the blood which bled in the condition that the body was equipped with hemanalysis equipment.

[0008] The base of a cartridge has tabular, the puncture member is prepared in one side possible [ sliding ], and this invention is the above-mentioned hemanalysis equipment characterized by arranging the electrode in an another side side further again.

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**OPERATION**

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[Function] With the hemanalysis equipment of this invention which has the device in which it collects blood with the means made congested, and possesses a puncture member, an electrode, and a display. The problem that it cannot decompress unless it sticks the base of the problem accompanying the approach of collecting blood by suction, i.e., a cylinder, on the skin. When the cylinder below phi1.5 mm is used, blood plugs up a hole. The problem that bleeding will stop, the problem that the structure of a syringe is complicated, etc. are solvable, and a general user cannot need skill, but can collect blood easily and quickly, and can analyze the detected matter.

[0010] Moreover, if the puncture member and electrode in hemanalysis equipment of this invention are made into a cartridge-type, since they can be made throwing away in one, bacterial infection etc. can be prevented. [ arrange / installing the electrode in the hemanalysis equipment of this invention in the location in contact with the blood pressed out by the congestion from the skin, and / furthermore, / in the background of a base prepared possible /-sliding / a puncture member ] Since the blood which bled contacts an enzyme and an electrode immediately, it is not necessary to establish a means to contact especially blood to an electrode etc., a series of actuation processes which analysis takes can be reduced, and inspection can be substituted for one-touch.

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**EXAMPLE**

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[0012] On the other hand, the blood collecting member 3 has the binding section 4 and the puncture section 5. The binding section 4 has become cylinder-like and a finger is inserted into this cylinder. The binding member 41 which makes a finger congested is formed in the interior of the binding section 4. Although this binding member 41 may consist of what kind of thing as long as it can make a finger congested, the thing using impregnation of air, the thing using the draw-down of the belt by the drive of a motor etc.; etc. can be used like the pressurization band used for measurement of blood pressure, for example.

[0013] As shown in drawing 4, the puncture section 5 has the tabular base 52 held in the sleeve 51 and the sleeve 51. The puncture cutting edge 53 is formed in one base 52 side possible [ sliding ] (refer to drawing 5 (a) and (b)), and it is electrode 54a in another side side. And electrode lead 54b It is arranged (refer to drawing 5 (c)). A base 52 has a height 55 and is electrode lead 54b. It extends to this height 55 and is electrode 54a. It forms. Electrode 54a in a height 55 Enzyme ink (not shown) is applied to one side. When various things can be chosen according to the detected matter in blood, for example, it measures the blood sugar level, the ink constituent containing glucose oxidase etc. can be used for enzyme ink. In addition, it is drawing 5 (d) about the perspective view which looked at the base 52 and the puncture cutting edge 53 from back. It is shown.

[0014] This puncture cutting edge 53, a base 52, and a sleeve 51 constitute the dismountable cartridge 6 from a blood collecting member 3. Therefore, it will become very advantageous for reasons of sanitation by making this cartridge 6 throwing away. The puncture cutting edge 53 is driven with an electromagnet 57 through the arm member 56, and projects from the height 55 of a base 52. An electromagnet 57 is driven by the interaction with the magnet (not shown) installed into the blood collecting member by turning on and off of the puncture cutting-edge discharge switch 23. The flat spring 58 is installed in the base 52, and the puncture cutting edge 53 projected by the arm member 56 is retreated. For the amount of protrusions from the height 55 of the puncture cutting edge 53, the blood (blood drop) which is in the condition which equipped this hemanalysis equipment 1 with the finger, and bled is electrode 54a in a height 55. What is necessary is just to set up so that it can contact. In addition, although the approach of driving the puncture cutting edge 53 using an electromagnet 57 was applied in this example, this invention is not limited to this but can drive the puncture cutting edge 53 by various approaches.

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hemanalysis equipment. First, a main switch 22 is turned on and a finger is inserted in the binding member 41. a finger -- which finger -- you may be -- moreover, right and left -- you may be which digit manus. Since the display material 2 is pivotable, when a left finger is inserted with the hemanalysis equipment 1 of this invention, it is drawing 3 (a). Like, when a right finger is inserted, it is drawing 3 (b). It can be made easy to use it, rotating the display material 2 like.

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[0017] According to the hemanalysis equipment of such this invention, a series of actuation processes can be reduced and inspection can be substituted for one-touch. Moreover, since this equipment possesses all of a blood collecting device, a puncture member, an electrode, and a display, a general user does not need skill but can use it easily and quickly. Furthermore, with the hemanalysis equipment of this invention, not only the blood sugar level but the various matter in blood can be analyzed by changing the class of enzyme ink to be used.

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[0019] Two electrodes 92 and 93 are formed in the wall 91 which constitutes the rectangular pipe of the blood collecting member 71, and enzyme ink 94 is applied to one electrode 93 (refer to drawing 8). These electrodes 92 and 93 are connected to a sensor (not shown) through a sleeve 51. The blood collecting member 71 is installed in the location where the blood drop pressed out from the skin contacts, and the centrum 95 of the blood collecting member 71 is set as size in which a blood drop is absorbed by capillarity. The blood collecting member 71 is produced with the ingredient which performs hydrophilic processing to the interior of the blood collecting member 71, or has a hydrophilic property preferably.

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

[Drawing 1] It is the perspective view showing an example of the hemanalysis equipment of this invention.

[Drawing 2] (a) The A-A sectional view of the hemanalysis equipment in \*\*\*\*1 is shown, and it is (b). A B-B sectional view is shown.

[Drawing 3] (a) It is drawing showing the condition of having equipped with the left finger to the hemanalysis equipment of \*\*\*\*\*, and (b) is drawing showing the condition of having equipped with the right finger.

[Drawing 4] It is drawing showing an example of the drive of the cartridge in the hemanalysis equipment of this invention, and a puncture member.

[Drawing 5] It is drawing showing the base and puncture cutting edge of a cartridge in the hemanalysis equipment of this invention. (a) It is drawing seen from the \*\*\*\*\* side, and is (b). It is drawing showing the condition that the puncture cutting edge projected, and is (c). It is drawing seen from the electrode side, and is (d). It is drawing seen from back.

[Drawing 6] It is drawing showing other examples of the drive of the cartridge in the hemanalysis equipment of this invention, and a puncture member.

[Drawing 7] It is drawing showing the blood collecting member and reusable puncture needle in hemanalysis equipment of this invention.

[Drawing 8] It is drawing showing the condition that the blood collecting member in the hemanalysis equipment of this invention decomposed.

**[Description of Notations]**

1 -- Hemanalysis equipment 2 -- Display material

21 -- Display screen 22 -- Main switch

23 -- Puncture cutting-edge discharge switch 3 -- Blood collecting member

4 -- Binding section 41 -- Binding member

5 -- Puncture section 51 -- Sleeve

52 -- Base 53 -- Puncture cutting edge

54a -- Electrode 54b -- Electrode lead

55 -- Height 56 -- Arm member

57 -- Electromagnet 58 -- Flat spring

6 -- Cartridge 71 -- Blood collecting member

72 -- Reusable puncture needle 73 81 -- Spring

82 -- Hammer 91 -- Wall

92 93 -- Electrode 94 -- Enzyme ink

95 -- Centrum

[Translation done.]

**\* NOTICES \***

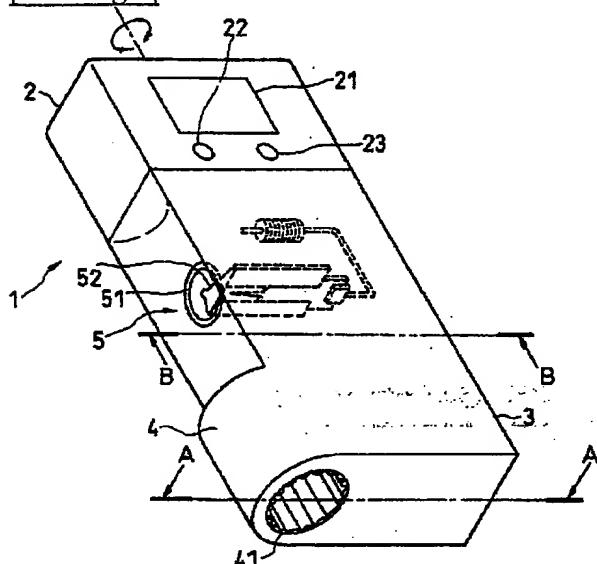
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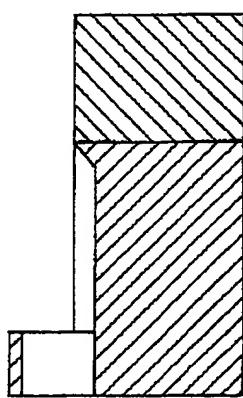
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**DRAWINGS**

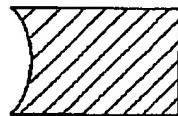
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**[Drawing 1]****[Drawing 2]**

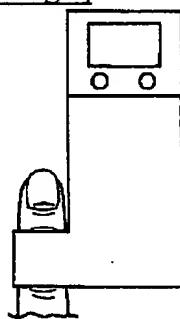
(a)



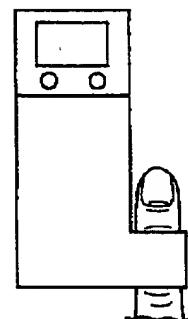
(b)

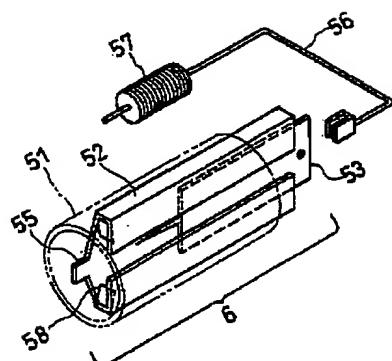
[Drawing 3]

(a)

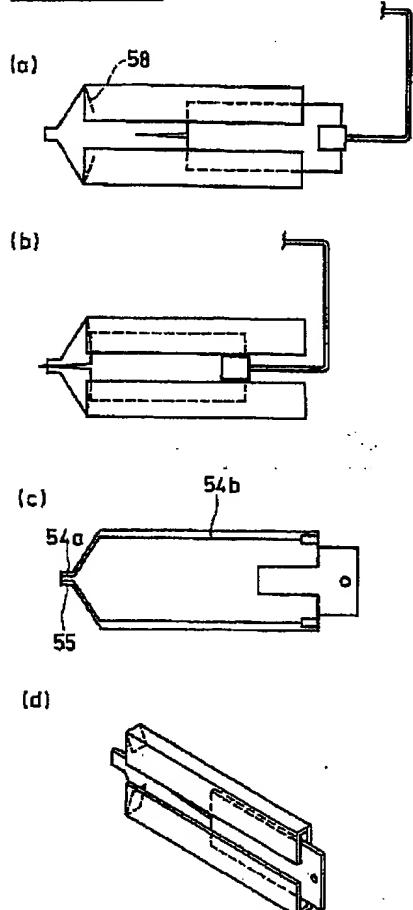


(b)

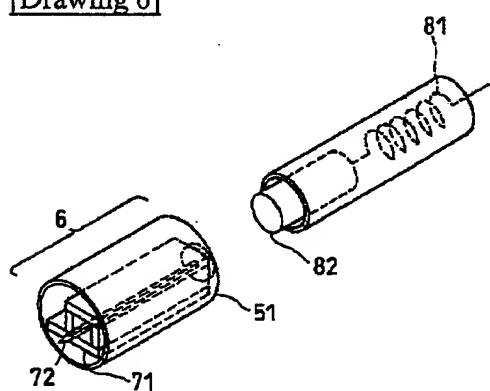
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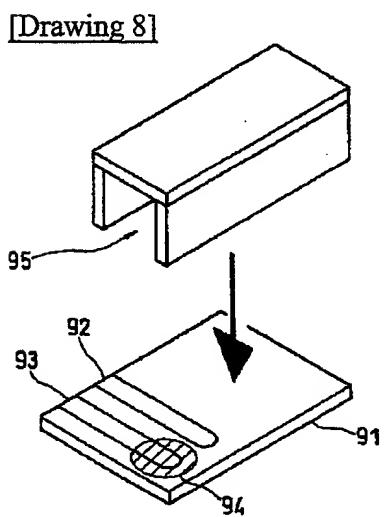
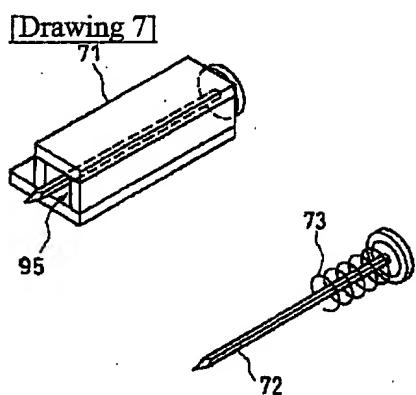


[Drawing 5]



[Drawing 6]





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[Translation done.]

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